EPA841-F-05-002A

Measuring Physical Habitat in Streams

Why Measure Physical Habitat?

- The physical structure of streams is key to understanding the stream biota.
- Alteration of stream physical habitat is among the leading human alterations to streams.
- Setting goals for maintaining and restoring physical habitat in streams is a key to improving stream quality.

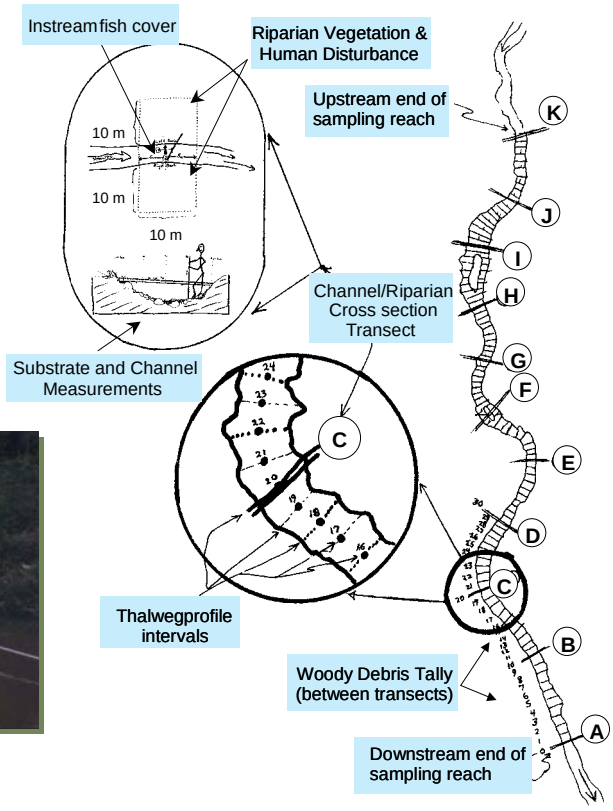
Goals

Produce a report on the condition of wadeable streams of the U.S. by December 2005

Promote collaboration across jurisdictional boundaries in the examination and assessment of water quality

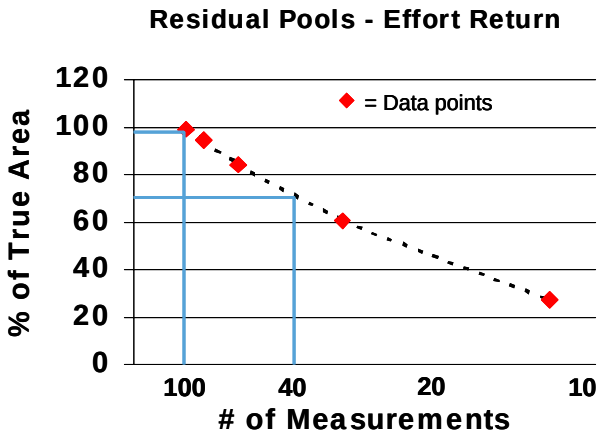
Build State capacity through use of survey design and comparability of methods or indicators

What Dimensions of Physical Habitat will be Evaluated?



How Many Measurements Do We Need?

- Residual pools are a critical habitat feature of streams
- Measurements must be taken frequently enough to be accurate
- Reducing protocol from 100 depth measures to 40 measures reduces accuracy from 99% to70%
- WSA protocol is sufficient to provide values that are a minimum of 99% of the true value.



Key Indicators of Physical Habitat

Channel Dimension

Habitat space may be the most important attribute (width, depth, bank measurements, Thalweg profile, residual pools).

Channel Gradient

Provides insights into the hydraulic energy of a stream (percent slope for the entire reach and between individual transects).

Substrate Size and Type

Important for fish, benthos and periphyton, an important determinant of what can live there and provides clues to potential stressors (Wolman pebble count, embeddedness).

Complexity and Cover

Determines niche diversity and cover from predation (woody debris count, fish cover variables).

Riparian Vegetation Cover and Structure

Determine stream temperature, organic inputs and channel morphology (riparian cover measurements, structure).

Channel-Riparian Interaction

Channel characteristics are altered by riparian and catchment land use, which in turn influence terrestrial-aquatic interactions (bank full height, incision, sinuosity from compass bearings).

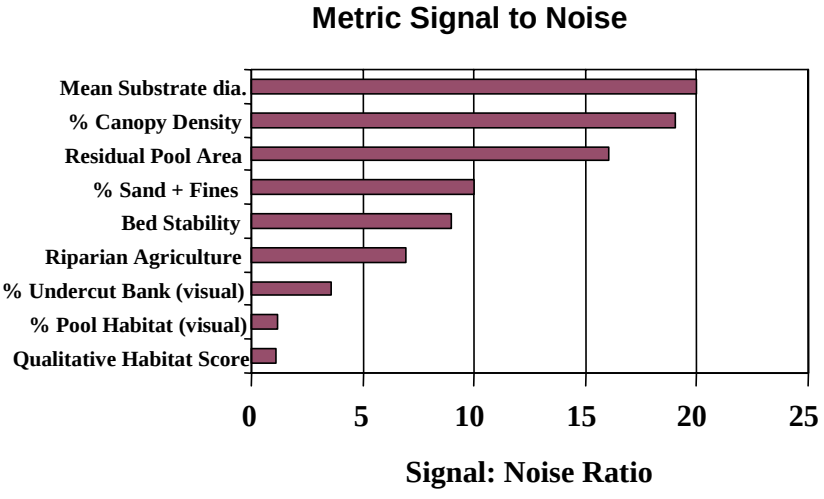
Anthropogenic Alteration

Among the markers for diagnosing stream disturbance and "reference condition" (human disturbance tally).

How Good is our Information on Habitat?

Can We Detect Signals?

- Signal must be greater than measurement noise
- Signal noise calculated by repeat visits at sites over the variability across all the sites.
- WSA quantitative habitat metrics are consistently above 5 (i.e., 5 times as much signal as noise).



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